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ABSTRACT

A special project which provided technical consultation and training for counselors specializing in rehabilitation of the severely disabled is described. A systems approach, utilizing mechanical assistive devices and other mechanical aids and adaptive techniques, enabled many of these clients to become more self-reliant and independent. Included in the report are: (1) a discussion and samples of the instructional aids which teach the counselors to gather and use information available from the client during counseling; and (2) 6 self-instructional articles which concern specific counseling techniques. These latter are reproduced in the appendix. A series of 8 brief case examples provide clarification of the program's approach. (TL)

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REHABILITATION RESEARCH REPORT

Robert E. Howard, Director
DEPT. OF REHABILITATION
Human Relations Agency
State of California

T-892

Technical Consultant Services to Innovate More Adequate Rehabilitation Services to Clients With Catastrophic Disabilities

FSS 69.12.18
July 1970

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State of California

Department of Rehabilitation

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To : All Professional Staff

Date : November 18, 1970

File No.: FSS 69-12-18

From : James A. Walker, Deputy Director
Field Support Services

Subject: Rehabilitation Research Report

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Technical Consultant Services to Innovate More Adequate Rehabilitation Services to Clients With Catastrophic Disabilities

FSS 69.12.18
July 1970

REHABILITATION RESEARCH REPORT

TECHNICAL CONSULTANT SERVICES TO INNOVATE MORE ADEQUATE REHABILITATION SERVICES TO CLIENTS WITH CATASTROPHIC DISABILITIES

Final Report: August 11, 1966 to June 30, 1969

A. G. Garris
Rehabilitation Consultant

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July, 1970

CALIFORNIA STATE DEPARTMENT OF REHABILITATION
FIELD SUPPORT SERVICES
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TECHNICAL CONSULTANT SERVICES TO INNOVATE MORE ADEQUATE REHABILITATION SERVICES TO CLIENTS WITH CATASTROPHIC DISABILITIES

FINAL REPORT

PROJECT SUMMARY

Special vocational rehabilitation services were provided to severely disabled persons previously considered unemployable and dependent.

Assistive devices were developed; combined with other mechanical aids and adaptive techniques, many severely disabled clients became more self-reliant and independent.

Instructional materials and training sessions were developed and provided for counselors specializing in the rehabilitation of clients with catastrophic disabilities.

A file of new assistive devices, their availability, quality, feasibility and distributors was developed and is currently maintained by the project consultant.

The project consultant was established as a knowledgeable resource, available statewide, for consultation in the unique, personal and vocational problems of the severely disabled.

Specialists in the fields of medicine, space technology, engineering, psychology and social work were brought together for the purpose of rehabilitating people with catastrophic disabilities.

TECHNICAL CONSULTANT SERVICES TO INNOVATE MORE ADEQUATE REHABILITATION SERVICES TO CLIENTS WITH CATASTROPHIC DISABILITIES

Final Report

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ABSTRACT

The project provided technical consultation and training for counselors specializing in rehabilitation of the severely disabled. Special assistive devices were developed and often combined with existing mechanical aids and adaptive techniques in order to solve the many problems of individuals with catastrophic disabilities. Self-instructional and informative booklets were written and distributed to rehabilitation counselors. The report contains several case examples and six of the training articles.

PLAN OF OPERATION, POLICIES, PROCEDURES, AND STAFF

The project's technical consultant has been Mr. A. G. Garris. As a counselor in various rehabilitation centers, Mr. Garris has pioneered services for the severely disabled. He has had broad experience in the development of mechanical assistive devices. This innovation project was a result of a survey made by Mr. Garris. The survey demonstrated the need for training and technical consultation for specialist counselors working with the severely disabled. Mr. Garris worked under the supervision of the Southern Regional Administrator of the Department of Rehabilitation.

With the assistance of the Department's Staff Development Unit and the state medical consultants, the project's consultant formulated the program to introduce this project to the district office staffs. In order to explain the project's available services for clients with catastrophic disabilities, these presentations included techniques of creative problem solving, special adaptive techniques used by successfully rehabilitated severely disabled persons, principles of mechanical assistive devices, and descriptions of available mechanical devices.

Each district has a counselor designated as a specialist in serving clients with catastrophic disabilities. Other counselors in the district consulted with this specialist counselor who in turn could request the services of Mr. Garris.

DISABILITIES SERVED

All services of the project have been directed toward better methods of serving those clients with disabilities caused by spinal cord injuries, stroke, and other neuromuscular conditions of a catastrophic nature.

METHODOLOGY

The project provided a technical consultant to the counselor specialists serving severely disabled clients in the district offices of the Department of Rehabilitation. This consultant was responsible for: introducing the project into the district offices; technical consultation with the counselor specialists; dissemination of information developed by the project; and the design and construction of mechanical and assistive devices.

District Introductory Programs

Services available through this project were introduced into each district office with the help of the Associate State Medical Consultant and the regional training staff. The presentations of the medical consultant have improved the quality and frequency of the use of local medical consultants. A part of each district program was devoted to training the counselors to use the local district specialists for the severely disabled and to use the state medical consultant.

One-day programs were planned to involve the staff in the exercise of their creative ability, and to demonstrate that such creativity can occur when the milieu permits and rewards this behavior. Unfortunately, the full programs could only be presented in San Bernardino, Santa Barbara, and Sacramento Districts. Other districts devoted less than a full day to this training. Not unrelated, those districts with the greatest administrative recognition and support for the project requested the greatest number of consultations. San Bernardino, Santa Barbara, and Sacramento Districts lead in these requests.

The district presentations featured a color-sound, 16mm film on synovectomy and arthrodesis, remedial surgery on the arthritic hand which is a breakthrough for one of rehabilitation's most frustrating problems. This film, by Dr. Leonard Marmer, enabled counselors to identify a relatively large number of clients who would benefit by Dr. Marmer's remedial and reconstructive surgery. It demonstrates the mechanical structure of the hand and techniques to increase mobility and decrease limitations due to dislocated joints. This film promoted the practice of careful observation of the hands, knees, and feet of clients and prompted the investigation of possible reconstructive repair work for these and other disabling conditions.

Many district programs included the panel discussion "How to Use Consultants." This panel included the district specialist for services to the severely disabled, the district training consultant, the district medical consultant, the project's technical consultant, and the Associate State Medical Consultant.

In two districts, the psychologist, Jim Holt, Ph.D. spoke on the topic, "How do You Really Feel About the Severely Disabled?" The discussions which followed increased counselors' awareness of their own feelings, the client's feelings, and those of the client's family. The basic counseling process is believed to be improved by the recognition of these feelings.

In districts with special or unique problems, expert consultants were brought in to assist in the introductory program. For instance, the Sacramento District covers a large area of the state in which heavy industry, lumbering, logging and farming predominate. Back injuries are prominent in the caseloads. Homer Pheasant, M.D., Orthopedist and VRA project director of the Industrial Injury Back Project at Orthopaedic Hospital, was involved with the all-day program for this district.

The Fresno District Program included a presentation by Thomas Gucker III, M.D., who is Medical Director of the Los Angeles Orthopedic Rehabilitation Center and member of the Medical Advisory Committee of the California Industrial Accident Commission. He is an outstanding authority on physical restoration and his talk on basic orthopedic disabilities emphasized evaluation, treatment, and restoration as he developed his topic "To Lessen the Disability."

Technical Consultation

The project's consultant visited district office specialists regularly and when requested by these specialists. He provided technical consultation on problems of comprehensive evaluation, maintenance medical care, determination of need for mechanical assistive devices, availability of appropriate equipment, and provided lists of specialized engineering designers and medical facilities equipped to perform special services for the severely disabled. The consultant maintained contact with special projects within the state in order to gain new knowledge or techniques in the rehabilitation of the severely disabled. He kept informed about the latest technological and medical developments valuable in improving the functions of the severely disabled. The consultant encouraged utilization of available community resources, educational institutions and other community organizations in developing training aids, devices and techniques to cope with the problems of the severely disabled clients.

Typical problems and requests received by the technical consultant are:

1. How and where to get an evaluation of a client who cannot initiate a bend at the elbow but has a usable hand.

2. How to evaluate the home-care needs of a young quadriplegic client who is about to return to his home.

3. How and where to get an evaluation of a fitting problem for a client with prosthetic hands.

4. Advice on the proper prosthesis to increase the function in the hands of a stroke victim.

5. How to construct an exercise device involving the pulleys, and the proper resistence for exercise in a warm-pool environment.

6. Information on new forming materials for assistive devices.

7. How to obtain a prescription for, and the construction of, custom fiberglass shoe inserts (DRA Project RD-924-M).

8. How to finance and arrange home-care for quadriplegic clients being fitted with a "golden arm" at Rancho Los Amigos.

9. Where and how special driving devices can be designed, constructed, installed, and tested.

10. How to evaluate a person's ability to drive a car equipped with special driving devices.

11. Where to obtain information regarding driver training and licensing requirements for clients with unique disabilities.

Resolving these problems is difficult for some cases and the decisions are vitally important to the client. For example, the evaluation of a severely disabled person's ability to drive a car can spell the difference between a lifetime of dependence or independence. Such an analysis was not available for clients anywhere in the state except through this project.

In addition to providing the answers to specific case problems, the technical consultant tried to give the counselors and district specialists a philosophy for meeting the needs of severely disabled clients. The clients should not only satisfactorily achieve a vocational goal, but achieve certain psychological goals. One major psychological goal is to develop independence in all areas of self-care, including independence in driving, shopping, transferring in and out of a wheelchair, and responsibility for personal appearance and cleanliness.

The technical consultant encouraged a "systems approach" to solving the problems of the severely disabled client. This approach involves an analysis of all daily living activities to determine the overall need for specific adaptive techniques and for special equipment in the home and at work rather than focusing on specific disabilities. Mechanical assistive devices must be designed to improve the client's functioning ability, and so they may be accommodated within the client's work area. In some instances, the work area and the flow of work were redesigned. A more economical and independent means for travel between home and work may be discovered by this systems approach. Counselors must become aware of the many adaptive methods and techniques which would permit their clients to function more efficiently. Thus, they can determine if clients are using appropriate adaptations or can be taught to use them. Creativity and versatility are keys to successful counselor-client performance; they vary from counselor to counselor and from client to client. It is believed that adaptive principles can be identified and combined in patterns tailored to the individual client and his catastrophic disability. Special case examples appear later in the report.

The technical consultant helped organize a new group in Southern California. Known as the Institute for Mobility Aids, Inc., it comprises medical personnel, engineers and social workers specializing in mobility problems. The organization will encourage federal and state agencies to subsidize a unified program for the design and production of vehicles to

help solve transportation problems of the disabled. Two vehicles are especially needed: (1) a personal, short distance vehicle which can operate outdoors and indoors, and (2) a custom-made vehicle which can operate on city streets and freeways.

Dissemination of Information Developed by the Project

The project's technical consultant attempted to remain abreast of the literature on the latest technological and medical developments of value to the severely disabled client. As one result, he established a small library of literature describing particular mechanical assistive devices and the companies which produce them. After evaluating such literature, the consultant sent copies to the district specialists. Each district specialist counselor was encouraged to maintain a file of local sources of the unique services needed by the severely disabled.

A series of news items in the Department's newsletter, The Rehab Roundup, stimulated counselors and supervisors to utilize this project's services. The articles presented a fairly wide range of concrete examples in which custom designed mechanical assistive devices played a major role in the rehabilitation of individual clients. The personal recognition given the counselors for developing devices is an integral part of an advertising campaign currently under way.

Turnover of counselor specialists for the severely disabled was high and continues to be high. This results in a wide range of competence among the counselors designated as specialists. This presents problems in planning group training conferences. One project solution was the development of self-instructional materials by the project's technical consultant. These include information regarding the tools available for the counseling process and how to use them. Many of the newer counselors begin to work with severely disabled clients with little or no work experience. The series of instructional materials teach the counselors to gather and utilize information available from the client during counseling. It focuses on the physical requirements needed to use certain tools effectively, the mental requirements for certain vocational objectives, and the recognition of potentially transferable skills. Some of the instructional aids developed for this project are summarized below.

Fuctional Wheels: This booklet describes the essential elements of fitting wheelchairs to people so that the wheelchair becomes truly functional. Over 30 photographs illustrate fitting problems and suggest modifications of this most valuable aid. Copies of this booklet may be obtained from: Information Officer, Department of Rehabilitation, 714 P Street, Sacramento, California 95814.

In addition to these booklets, the technical consultant has written smaller articles for the specialist counselors of the severely disabled, concerning specific counseling techniques.

Principles Involved in Creating Mechanical Assistive Devices: This is a self-instructional program designed to increase the reader's awareness of the need for mechanical assistive devices. It explains how simple machines work, how such principles are applied to achieve mechanical advantage, and encourages the reader to experiment with mechanical principles. Removing the mystery

of how machines work places the counselor in a better position to utilize mechanical principles in solving clients' unique needs for mechanical assistive devices. (See Appendix A, Page 21)

The Use of Pertinent Personal Tools, Adaptive Techniques and Orthotic Devices in Rehabilitation of the Physically Severely Disabled: This self-instructional program is designed to introduce various adaptive techniques used by disabled persons in order to meet particular needs created by their disability. Once the counselor has become aware of these adaptive techniques, he is in a better position to evaluate their application and usefulness to his individual clients. Clients use adaptive techniques in their homes and in their use of personal tools. In their willingness to utilize needed help, and in their acceptance of suitable orthotic devices, they broaden the base of useful adaptive techniques. (See Appendix A, Page 37)

What Lies Behind the Work History? This self-learning program demonstrates the process of gaining pertinent information from the disabled client early in the rehabilitation process. It presents a simple, but effective technique to newer members of the counseling staff so that every interview becomes an opportunity to increase their knowledge of the client. The discovery and utilization of the client's interests, skills, and past experience shorten the retraining period and often insure that the new vocational objective will be rewarding to the client. (See Appendix A, Page 53)

A Guide for Interviewing Persons with Spinal Cord Injuries: This article provides a list of factors to consider when planning for rehabilitation of persons with such injuries. (See Appendix A, Page 65)

Disuse, the Underevaluated Factor in Disability: This article discusses how disuse or inactivity further debilitates a disabled person. Examples with specific disabilities demonstrate that appropriate physical activity can arrest or reverse the effects of loss of some physical or mental functions. (See Appendix A, Page 71)

Adaptive Techniques and Assistive Devices Useful in Rehabilitation: This article provides specific examples of techniques which enable a disabled person to function more efficiently within the limits of the disability. (See Appendix A, Page 75)

Design and Construction of Mechanical and Assistive Devices

Specialist counselors of the severely disabled frequently consulted with the technical consultant in order to evaluate a client's special needs for assistive devices to overcome problems of communication, transportation or object manipulation at work. Through funds provided by the project, the consultant contracted with appropriate specialized personnel, on a per diem basis, to design and give cost estimates for the construction of appropriate mechanical assistive devices. Requests for the design of special devices and work areas increased during the life of the project. In many cases, the mechanical devices developed for a particular disabled person were applicable to other disabled persons. The case examples following this section illustrate the development of special devices and modification of current, manufactured devices for individual clients.

Some of the special devices designed for rehabilitating clients with catastrophic disabilities are listed below.

1. Adjustable work table and lift for TV repairmen.
2. Close vision copy holder for typist with only near vision.
3. Office desk with a circular rotating tabletop to hold microscope with mechanical controls.
4. Sliding holder for telephone switchboard operated by a client who must work in a prone position.
5. Custom ramps, individually designed for wheelchair users in their home or office spaces.
6. Special automobile control devices for all types of quadriplegics.
7. Special adaptations of a sewing machine.
8. Special wheelchair lifts for truck vans.
9. Anti-roll devices for wheelchairs.
10. Modification of a walker so client could walk up and down slopes.
11. Special test-tube holder.
12. Special holder for dogs being clipped by a paraplegic client.

A great variety of additional requests were received from specialist counselors. Many requested information about commercially available devices and equipment. Answers explained what to buy, the reasons for the purchase, and where to buy the necessary special device. Before any custom device was designed or constructed, commercially available items were investigated for feasibility or adaptability to solving the problem. The many requests for this kind of information suggest that a clearinghouse be maintained to supply historical information, as well as current listings of commercially available products, their quality, upkeep, replacement, and repair.

Counselors appear to have most difficulty with the quadriplegic and paraplegic group of clients. Successful rehabilitation with this group requires that the counselor have varied information about skin care, self-care, adaptive techniques, personal tools, appropriate equipment including standing boards, beds, wheelchairs, driving controls, and hydraulic and electric lifting devices. He must also know appropriate techniques of maintenance medical care and control of precarious health conditions to prevent additional deformities or loss of health. This is the principal reason for appointing district counselor specialists for the severely disabled and why these specialists as resource persons in the district, should receive continuing training.

A great deal of the client's time and energy used in inefficient traveling modes can be saved for more important vocational and training pursuits. The transferring of a client from a wheelchair to a car or passenger seat can be very awkward and time consuming. Entry into van-type vehicles can be arranged through a side or rear door equipped with self-operating hydraulic or electric power lifts. A client driving an automobile from a wheelchair is an obvious improvement over the complicated process of transferring the driver from the wheelchair to the driver's seat.

Recent advancements in control mechanisms have enabled many paraplegics and some quadriplegics to become independent travelers. For example, a non-grasping hand can be attached to a joy-stick control of an automobile, enabling the client to drive the car: accelerating by a forward push, braking by a backward pull and turning by moving the joy-stick to the left or right.

The following special case examples illustrate some of the ways in which many of the elements discussed so far have been used, individually or in combination, to serve the unique needs of particular clients.

SPECIAL CASE EXAMPLES

Case #1

The project consultant was asked to re-engineer equipment and work space for a severely disabled employment counselor employed by the Department of Employment. Little consideration had been given to the job tasks and how they could be performed. The client was disabled in all extremities and had to work from her electric-powered wheelchair. The office aisles were too narrow to permit both of her arm supports on the wheelchair and this deprived her of the use of her left hand. She tried to keep all her papers, files, and other work material within easy reach on a wheelchair tray. These inefficiently arranged items made an ungainly pile of the tray. The following problems were identified after observation of the disabled worker's performance throughout a typical work day.

1. She required the assistance of her supervisor to place needed objects, forms, and other work materials within her reach on the wheelchair tray. The tray prevented her sitting close enough to use portions of the desk which she could have reached otherwise.

2. When she traveled down the narrow halls of the building, her slow-moving chair caused traffic congestion behind her.

3. The limited office work space permitted only the right arm support on the wheelchair. Another way had to be found to bring her left arm into use.

4. She used a tenodesis splint on her right hand in order to write. This is a tedious function for the wrist muscle and was fatiguing when she wrote for more than an hour and a half.

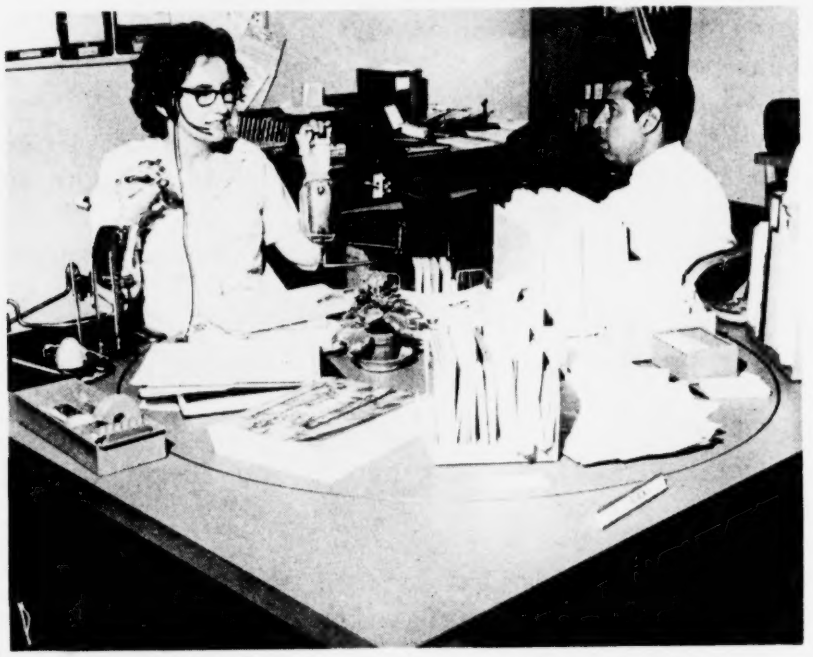
5. She had no back-up equipment; if her wheelchair broke down, she would not be able to work.

A systems approach was used to redesign her entire work area and to plan for optimum interaction of all mechanical adaptive devices. The wheelchair tray was eliminated so she could roll the wheelchair close to the desk work surface. A special desk was designed to accommodate an electrically operated lazy susan; four feet in diameter, rotating in the middle of the desk. The edge of the rotating portion extended from the front of the desk and over her lap. This desk was constructed and painted in a style similar to the other office furniture. Items and files were arranged on the desk to correspond to her morning or afternoon duties and the desk work surface revolved accordingly. She no longer depended upon her supervisor for personal assistance in finding, sorting, and arranging her work materials.

A faster wheelchair was ordered to relieve traffic congestion behind her as she traveled along the narrow halls. This allowed her to use her original wheelchair at home, increasing her independence there, and provided a temporary substitute at work when the electric-powered wheelchair needed repair.

Case #1 continued

A new type of arm support, which did not protrude beyond the sides of the wheelchair, permitted her to move more easily and quickly through the narrow aisles, halls and doors of her office building. A pen holder, designed for use with the tenodesis wrist splint, does not require the fine muscle control previously needed, thus reducing the fatigue from extended periods of writing. These improvements demonstrated how the systems approach can help the seriously disabled worker to become a competitive worker.



Case #2

The client was a spinal cord paraplegic (industrial accident) with a vocational objective of self-employment building wire cages for animals. The roles of wire mesh used in cage construction were heavy and needed to be straightened as they unrolled. The electric portable wire cutting machine was awkward and often bent the ends of the mesh. His hand-made bender did not bend the wire mesh properly.

A "systems approach" was used to redesign the work materials and the flow of work. The project director devoted a day and a half evaluating the problems in consultation with the district specialist and the outside consultant. A special holder was designed to hold and straighten the wire mesh as it unrolled. A consultant, with previous experience in aircraft sheetmetal construction, located a device which cut and bent the wire mesh appropriately. Thus, the project assisted the client to start in his own business. He now has two employees and cleared $18,000 last year (in 1969).

Case #3

A triple amputee had been placed in a job as a motorcycle parts salesman. Confined to a wheelchair, he was unable to reach the top shelves for parts. Within a week, the project director and his consultants had devised and delivered a device which resembled the long-handled stock grippers used by old-time grocers to reach boxes on high shelves. This client was earning $100 per week after six months of on-the-job training.

Case #4

This client, who had had one leg amputated, was self-employed in his own tailor shop. He had been referred for rehabilitation services by the Department of Employment because his business had been declining. The rehabilitation counselor evaluating the situation, realized that the shop was small, the ventilation was poor, and the furnishings were not organized to accommodate the tailor's disability as he sat in a kitchen chair while working. The project consultant and the rehabilitation counselor employed a carpenter to modify the shop to incorporate a reorganized work arrangement which provided privacy for customers during fittings and improved the amputee's mobility. The counselor ordered a new prosthetic leg and swivel chair. The tailor shop's improved appearance and accommodation for customers, as well as the tailor's increased efficiency, was responsible for an increase in the client's business.

Case #5

Because of his unusually good mechanical and electrical aptitudes, a 28-year old client had been placed in a training job as a television repairman. He attempted to repair the television sets while sitting in his wheelchair. Hemophilia had damaged his joints and he was unable to lift the heavy sets from the floor to the workbench.

The client and the rehabilitation counselor agreed that a special workbench would have to be constructed, preferably, with an electrically powered portion which could be lowered to slide a television chassis on or off at floor level and then raised to the most comfortable working height. The project consultant assisted in the design and production of such a special electrically-powered workbench. Also it was equipped with easy-glide casters to permit mobility from one part of the shop to another. A safety feature was incorporated which would prevent the lift from falling to the floor in case of power failure.

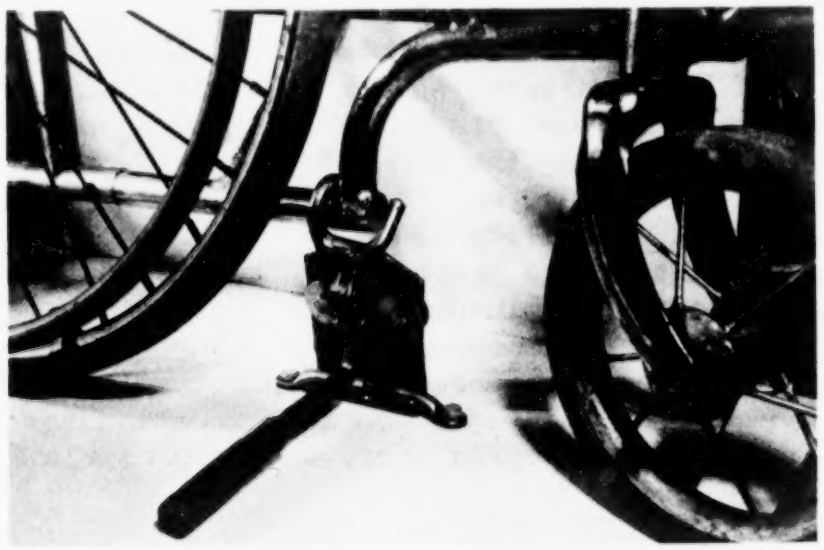
Such a variable-height work table could be used by persons with other types of disabilities. For example, any client with limited bending ability could utilize such a device in a variety of occupations.

Case #6

A number of typists are able to see if their copy is positioned very near to their eyes. A counselor for the blind presented this problem. The solution is an adjustable copy-holder that can be attached to either side or the back of the typist's desk.

Case #7

This hold-down device holds a wheelchair securely to the floor of a van-type vehicle. Its use will prevent the wheelchair from rolling or tipping and causing additional injuries. Seat belts attached to the frame of the vehicle should be used. Details of this device are available on request from the project director.



Case #8

The client was confined to a wheelchair and suffered from severe edema which required careful weight watching. A frame with two channels was superimposed on a bathroom scale. While in the wheelchair, the client rolls onto the channels. The weight registers on the bathroom scale. The client's weight is calculated by subtracting the known weight of the wheelchair.

APPENDIX A

SIX INTEGRATED ARTICLES

FOR USE IN TRAINING

REHABILITATION COUNSELORS

FOR THE SEVERELY PHYSICALLY DISABLED

PRINCIPLES INVOLVED IN CREATING MECHANICAL ASSISTIVE DEVICES

By: A. G. Garris, Consultant

California Department of Rehabilitation

Robert E. Howard
Director

This is the first in a series of six self-instructional aids published by the Department of Rehabilitation. These training aids are the product of an innovation project supported, in part, by a grant from the Social and Rehabilitation Service, Department of Health, Education, and Welfare, Washington, D.C. 20201

Foreword

Some of my colleagues have asked, "How do you become aware of the need for mechanical assistive devices?" It is a difficult question to answer. It involves the application of the knowledge of how simple machines work, how mechanical advantage is achieved and how to "dream" with mechanical principles.

Everything that now exists started with an idea. Your observation of your client's needs and an exploration of the possible solution are priceless ingredients of the counseling process.

The goal of this self instruction exercise is to remove some of the mystery of how machines work. Knowing how they work helps in utilizing them in various situations to make the "impossible" tasks become possible and the difficult tasks easier.

Archimedes is reported to have expressed his awe or appreciation of the lever when he said, "Give me a lever long enough, a place to stand, a fulcrum and I can move the world." The environment of your client is his world. Perhaps you can move things around in it to his benefit.

--A. G. Garris

A mechanical assistive device is a pertinent personal tool. It is usually designed to perform a specific act. The act cannot be performed adequately without the tool. The tool may be used to perform a variety of similar activities. The tool or assistive device is composed of a single adaptation or a combination of the simple machines: (1) the lever, (2) the wheel and axle, (3) the pulley, (4) the inclined plane, (5) the wedge, and (6) the screw. It may also include more advanced technology such as various servo-mechanisms (self-correcting devices), using negative and positive feedback and electronic communication systems. Most devices however are composed of the six simple machines listed above. An understanding of their application removes some of the mystery of complex machinery.

The simple machines by their composition and arrangement make useful work easier to perform. The extent to which the machines do this is called mechanical advantage. It is expressed as a ratio of the force that performs the useful work of a machine to the force that is applied to the machine.

If a machine requires 5 pounds of effort to operate it and the machine exerts 50 pounds, the ratio would be 1 to 10.

Figure similar ratios listed below:

	Man Effort	Machine Effort	Ratio
1.	10 lbs.	50 lbs.	1 to _____
2.	50 lbs.	500 lbs.	1 to _____
3.	1 lb.	16 lbs.	1 to _____

Six Simple Machines

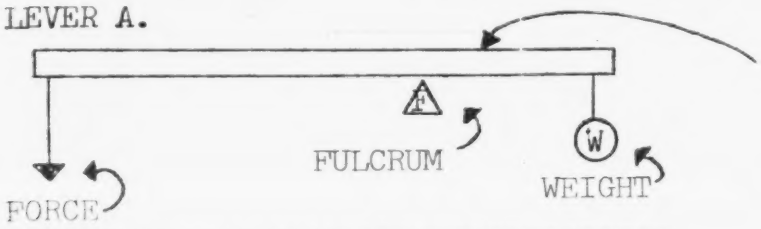
Examine the six simple machines and learn how they work.

Turn to page 34 to check your answers.

THE LEVER

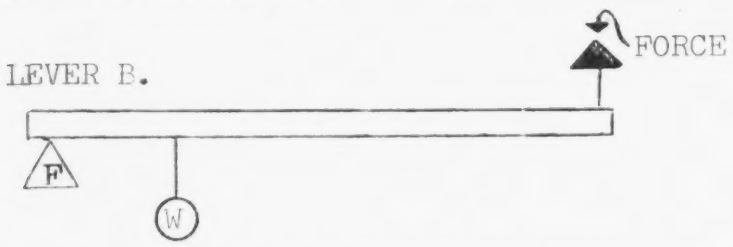
The lever is commonly perceived as a bar used for plying or dislodging something. It has other uses. A more technical definition calls a lever, "a rigid piece that transmits and modifies force or motion when forces are applied at two points and it turns about a third." The examples below show 3 kinds of levers:

LEVER A.



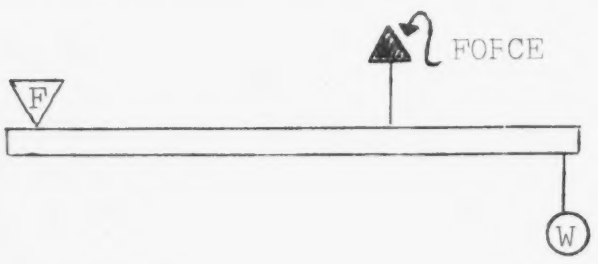
Note: The fulcrum is the point around which the lever revolves.

LEVER B.



The placement of the fulcrum determines the mechanical advantage.

The nearer it is to the weight the greater is the mechanical advantage.

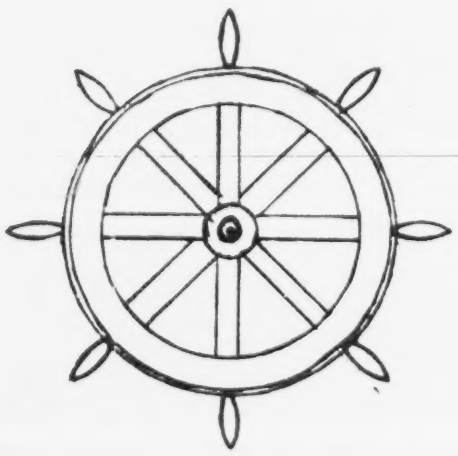


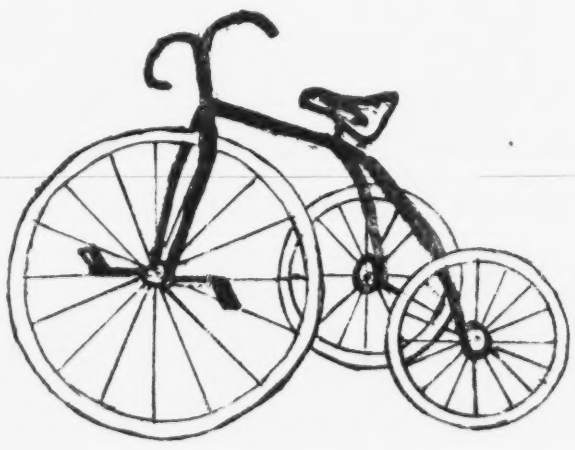
4. What piece of common playground equipment is an example of A? _____

5. A man using a shovel represents one of the levers. Which one? _____

THE WHEEL AND AXLE

The essential mechanical element of the wheel and axle is the rigid attachment of the axle to the wheel so that power can be transmitted from the axle to the wheel or from the wheel to the axle. The spokes of a wheel have the same mechanical advantage of the lever. The large wheel on the old sailing ships extended the spoke levers through the rim of the wheel in order to make it easier to turn the rudder of the ship.



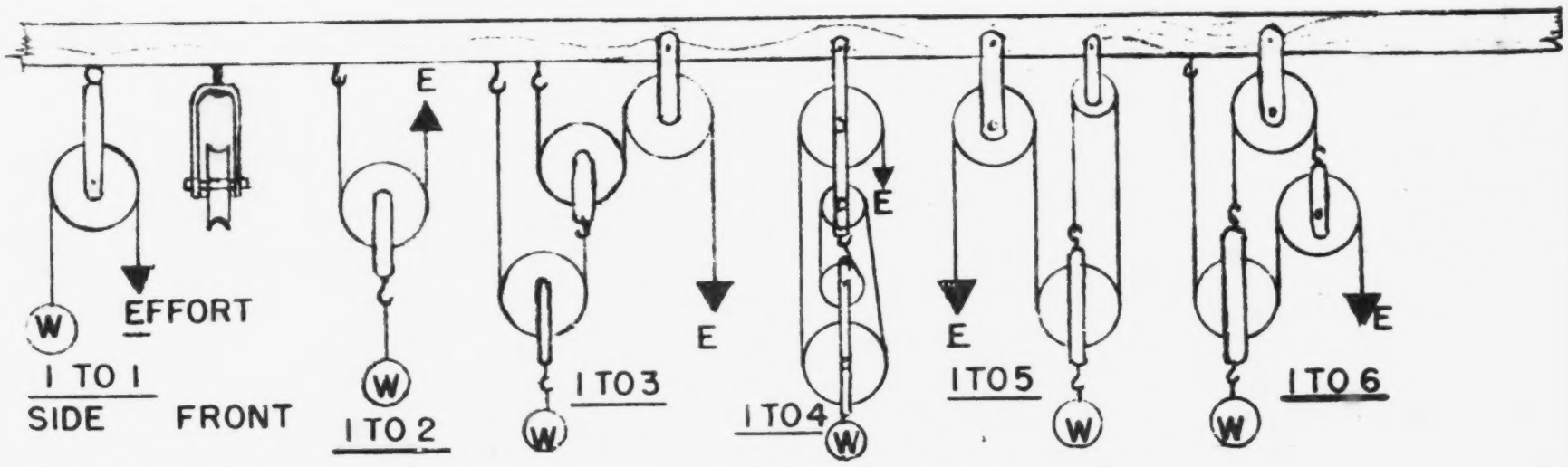


6. Which "axle and wheel" on a tricycle is an example of this mechanical principle? _____

Turn to page 34 to check your answers.

THE PULLEY

The pulley is a wheel with a grooved rim. The axle is not attached rigidly to the wheel; instead it is attached to a U-shaped holder, as shown in the "front" sketch below. A pulley may be used to change the direction of a pulling force. The effort or amount of pull required to lift a weight may be reduced when a pulley, or specific combination of pulleys, is utilized.



The ratios below each diagram indicate the amount of pulling effort required to lift a weight. These theoretical ratios do not include the effect of friction. For example, using the pulley with ratio of one to one, a 12-pound weight will require a downward pull of 12 pounds. Using pulleys arranged to give a ratio of 1 to 3, a 4-pound pull will lift a 12-pound weight.

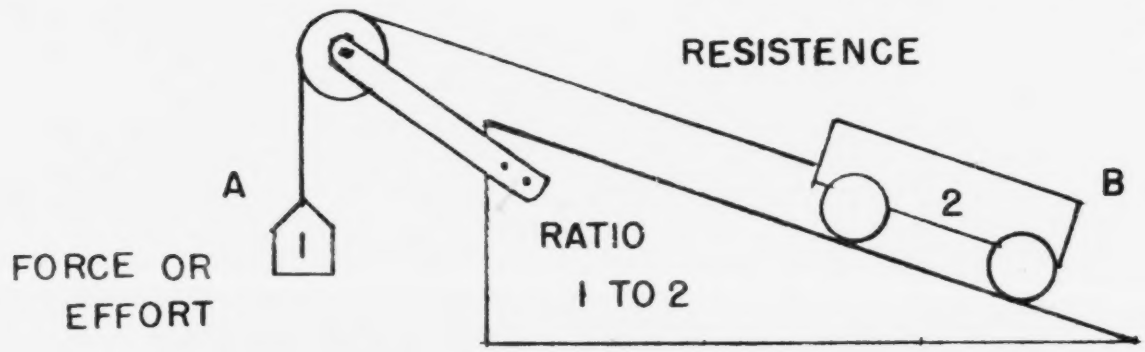
Use the ratios to determine the amount of pull necessary to lift the following weights:

		Answer in pounds
7.	Ten pound weight using ratio 1 : 1	_____
8.	Ten pound weight using ratio 1 : 2	_____
9.	Sixteen pound weight using ratio 1 : 4	_____
10.	Twenty-five pound weight using ratio 1 : 5	_____
11.	Thirty pound weight using ratio 1 : 6	_____

Turn to page 34 to check your answers.

THE INCLINED PLANE

The inclined plane is an easier way to move heavy objects.



The ratio illustrated above is 1 to 2 effort against resistance. Historians tell us that an inclined plane was used to lift rocks used in building the pyramids in Egypt, as cranes had not been invented.

12. How much force in pounds would it be necessary to exert at point A to lift 20 pounds at point B? (Ignore any friction loss.)

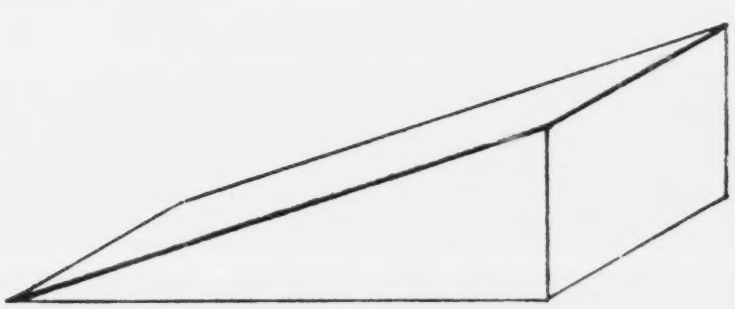
ANSWER: _____

THE WEDGE

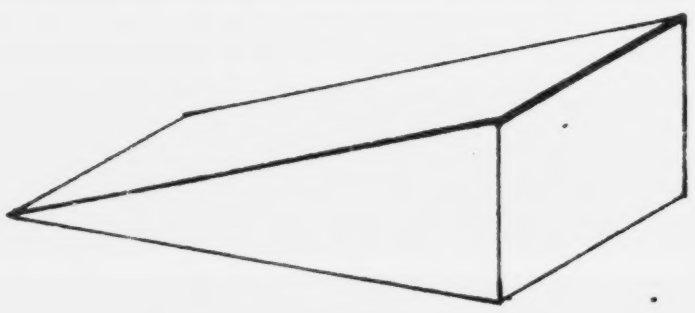
A wedge is a piece of substance (wood, iron, etc.) that taper to a thin edge on both sides **and it is used for splitting wood and rocks, raising heavy bodies or for tightening by driving it into something. Axe handles are often tightened by wedges.**

13. Which of the drawings below is a wedge? Answer: _____

DRAWING A.

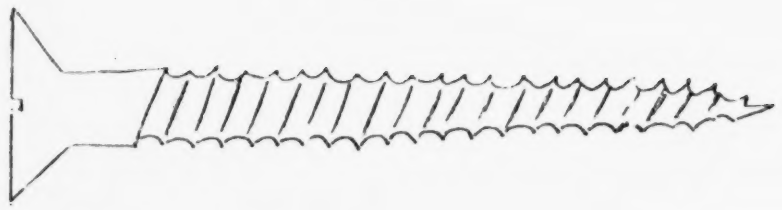


DRAWING B.



Turn to page 34 to check your answers.

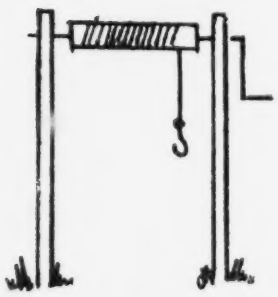
THE SCREW



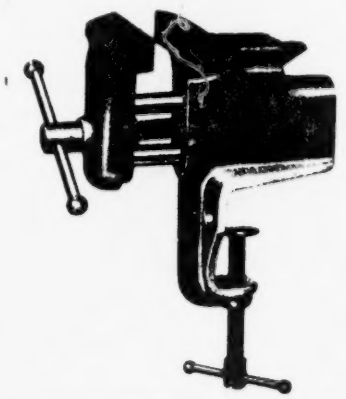
The screw is similar to an inclined plane that runs around a cylinder. Turning the screw by using the slot at the cap end will cause it to enter a substance or emerge from it depending on which direction the screw is turned. The same principle is used on bolts. Its principal use is to draw things together and hold them securely.

14. Is a vise an example of the screw principle?_____

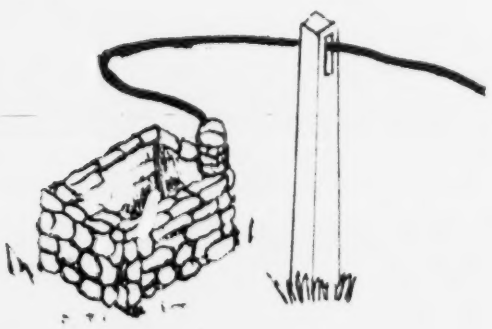
Now you have learned the functions of the six simple machines: the lever, the wheel and axle, the pulley, the inclined plane, the wedge and the screw. In the sketches below indicate which simple machines you can identify. One picture may represent more than one machine.



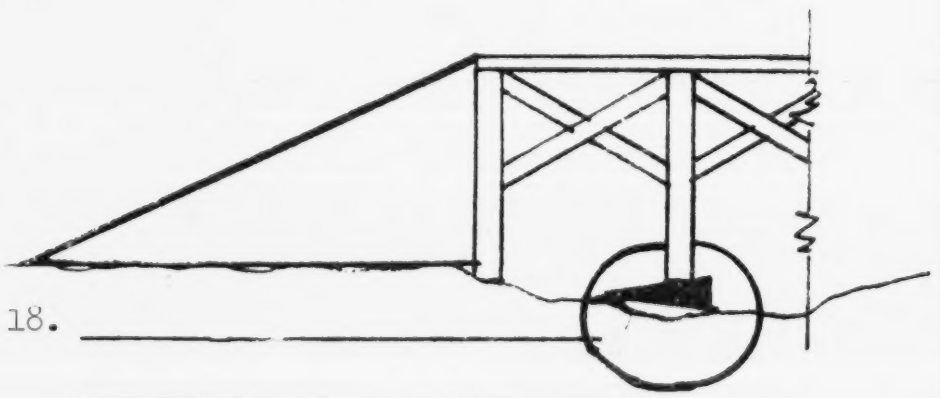
15. _____



16. _____



17. _____



18. _____

_____

Turn to page 35 to check your answers.

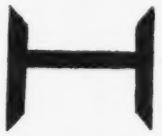
A pair of pliers is a good example of a mechanical assistive device. Let's take a look at a pair of pliers.

Note they are essentially two levers attached to each other. The attachment is a fulcrum and to gain mechanical advantage it is placed nearer one end. Name the simple machines in the items below:

Device	Simple Machines
19. Scissors	_____
20. Ramp	_____
21. Vise	_____ and _____

SHAPE OF OBJECT

The shape of objects determines their strength. It is therefore an important factor in design. A thin rectangular sheet of paper will support a book if properly shaped and held in shape. An egg shell would have to be more than twice as thick if it were any other shape than spherical. Some shapes are stronger than others and we find them used repeatedly in construction.

The I-beam, the H column,  and the cylinder post are examples.

Angles and bends build rigidity and strength in structure.

22. Which would be the stronger structure if their weights were identical: the I-beam or the angle?

ANSWER: _____

Turn to page 35 to check your answers.

The design of your machine involves strength, pressure, mechanical advantage, and various other specifications. These specifications are your "wishes." Bionics is a systems approach to determine if animals or plants have already solved the problem of combining your "wishes" in one system.

23. What part in animals or plants might have been a model for the pinch of the pliers?

Answer: _____

24. How did the part achieve its strength? Review lower half of page 30.

Answer: _____

SETTING THE SPECIFICATIONS FOR A MECHANICAL ASSISTIVE DEVICE

A simple meaning for the long word, specifications, is the answer to the question "what do you want the device to do?" Depending on the complexity of the problem, the specifications can become quite detailed. One of the basic rules in design is simplicity. Applying the above information in setting the specifications for pliers, name the three most important requirements.

25. _____

26. _____

27. _____

Turn to page 35 to compare your answers.

Specifications cannot be accurately set up before a thorough analysis of the problem has been completed. Working through an actual problem will enable you to experience the steps to take in its solution.

28. A disabled client is a triple amputee. He has excellent use of his left hand and arm. His right arm is amputated above the elbow. He wears a prosthesis on this arm. He locks the elbow and he is able to propel his chair efficiently by using his good left arm and the prosthetic arm. Both lower legs are high amputations and he is not able to wear leg prostheses. His counselor has placed him as motorcycle parts counter salesman. Analysis of the job tasks reveals that he can manage all the requirements except reach parts which are kept in open boxes. The boxes and their contents do not weigh over 4 pounds each. They are kept on the two top shelves, 6 and 7 feet from the floor, out of reach. This part of the job involves removing an open box from the unreachable, top shelves, removing a small part, and replacing the box on the shelf. The parts boxes are 1/8" thick cardboard with sturdy corners, but the sides compress easily. The counselor has investigated the use of commercial pick-up devices and discovered that most of the devices are designed to pick up objects from the floor. Based on this information, set up as many of the specifications as you can for the needed device:

A.

B.

C.

D.

E.

29. Based on information contained in the specifications provided, sketch such a device and indicate each part's function.

Compare with actual solution on page 36.

During this learning experience, if you have felt the urgency of the need for the special device in the problem and began to believe some sort of solution could be worked out (even though you may have been unable to design it completely), you have participated in creative behavior. Your new ability to use these mechanical principles in an imaginative way will make your job more rewarding. The obstacles faced by you and your client will not seem so formidable. Your ability to identify the problem provides half of its solution.

Consult with your district specialist to clarify your specifications. Your department consultant has located many experts in design and construction of special devices. Funds are available for design. Solving unique problems for your client and providing pertinent personal tools for him will increase his ability to compete with other workers.

Answers to

PRINCIPLES INVOLVED IN CREATING MECHANICAL ASSISTIVE DEVICES

Answers to Page 25:

1. 1 to 5

2. 1 to 10

3. 1 to 16

Answers to Page 26:

4. Seesaw

If your answer was in error take another look at lever "A" and imagine a small boy sitting where FORCE is applied and a heavier boy at WEIGHT.

5. Lever A or C

A. The man-shovel combination is an example of lever "A". One hand of the shoveler becomes the FULCRUM (point of revolvement) and the other hand pushes down on the handle (FORCE) lifting the amount of dirt in the shovel (WEIGHT).

C. If you were thinking of the second phase of the shoveling process, or throwing dirt upward, one hand becomes the FULCRUM and the other hand exerts the FORCE. In this event, lever C would be the correct answer.

6. Front wheel — If your answer was a rear wheel, please take up knitting.

Answers to Page 27:

7. 10 pounds — If your answers to not correspond with these, you had better use an electric hoist.

8. 5 pounds

9. 4 pounds

10. 5 pounds

11. 5 pounds

Answers to Page 28:

12. 10 pounds

13. Drawing B — If you goofed, take another look at the inclined plane.

Answers to Page 29:

14. Yes; when the handle of the vise is turned the jaws move together and any object in between is held securely.

15. Wheel and axle; pulley

16. Screw; lever

17. Lever

18. Inclined plane; wedge

Answers to Page 30:

19. Lever

20. Inclined plane — If you wrote wedge for your answer, take another look at the wedge and compare it with the inclined plane, page 28.

21. Screw and lever — The handle of the vise is a lever.

22. The I-beam — The shape of the I-beam contains four angles and, therefore, would be much stronger.

Answers to Page 31:

23. The claw of the lobster or crab, or the mandibles of an insect, are the nearest examples in the "animal" world.

The "lever forces" are attached differently, but the fulcrum is easily located and mechanical advantage is well achieved. (If you doubt this, allow a tiny sea crab to pinch your fingers.) Other examples may illustrate these principles.

24. The claw achieves its strength by the shape, thickness and rigidity of the exterior skeleton.

25. Mechanical advantage — Pliers pinch harder than fingers.

26. Strength of metal — Pliers resist torsion (twisting) and collapse.

27. Firmness of bite — The jaw of the pliers hold more securely.

Answers to Page 32:

28. The device:

A. Must be capable of being operated with <u>one hand</u>, his left;

B. Must <u>grasp the box securely</u> and not cause it to collapse;

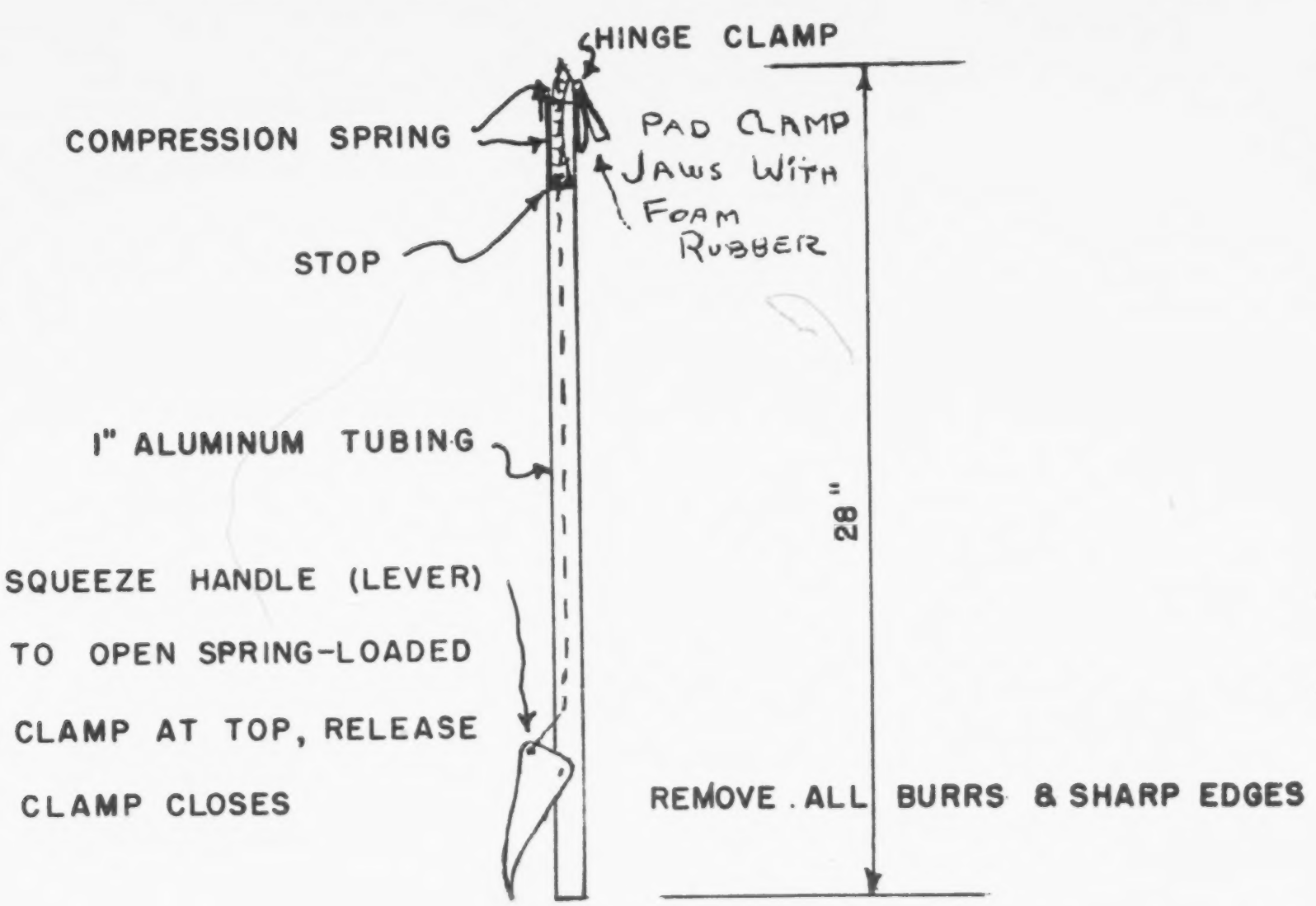
C. Must <u>hold the box securely until</u> a part can be removed and the box can be <u>replaced</u> on the top shelf;

D. Should be <u>light weight</u>, because if the client overuses his arms in propelling his chair any excess weight increases his arm fatigue;

E. Should be <u>built to endure</u> much daily use for years.

If your answers included three or more of the above specifications, you show promise in this most important area of a counselor's work.

A SELF-LOCKING DEVICE USED TO LIFT BOXES FROM HIGH SHELVES:


HINGE CLAMP
COMPRESSION SPRING
PAD CLAMP JAWS WITH FOAM RUBBER
STOP
1" ALUMINUM TUBING
28"
SQUEEZE HANDLE (LEVER) TO OPEN SPRING-LOADED CLAMP AT TOP, RELEASE CLAMP CLOSES
REMOVE ALL BURRS & SHARP EDGES

THE USE OF
PERTINENT PERSONAL TOOLS, ADAPTIVE TECHNIQUES,
AND
ORTHOTIC DEVICES IN
REHABILITATION OF THE PHYSICALLY SEVERELY DISABLED

By: A. G. Garris, Consultant
Department of Rehabilitation

Robert E. Howard
Director

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INTRODUCTION

Every meeting a counselor has with a physically disabled person is an opportunity to learn about adaptive techniques. Most disabled clients are glad to share this kind of information with interested counselors because they realize it may be helpful to other disabled persons. These adaptive techniques may have been learned in treatment centers or may have been devised by the client to meet some particular need.

Non-disabled persons often do things the hard way because they have a surplus of energy. Among disabled persons, adaptive techniques which conserve energy become increasingly important. Most vocationally successful, severely disabled persons demonstrate these adaptive techniques. The techniques consist of simple things which enable them to compete with non-handicapped people. For instance, their preparations for travel include planning based on accurate knowledge of the time and activities required to reach the destination. They must anticipate problems such as the availability of suitable parking space and architectural barriers. When they need help to perform certain acts, they become skilled in giving direction to those who help. Items used daily are stored in accessible places and functional furniture remains in convenient locations. In a carefully arranged environment, time and effort can be greatly conserved.

Because the needs for adaptive behavior vary, adaptive techniques also vary. One goal of this self-instruction booklet is to increase the counselor's awareness of the various possible adaptions. Then his clients can be evaluated for their use of efficient adaptive techniques. Clients demonstrate such techniques in their homes, in their use of pertinent personal tools, in their willingness to utilize help from others, and their acceptance of suitable orthotic devices.

This article will refresh your memory for adaptive techniques. You will become more aware of the particular ways in which you accomplish tasks and the ways in which your disabled client performs. Getting "ready to live" may take more of your client's energy than necessary. Any energy he saves can be used vocationally. You will learn to recognize pertinent personal tools when you see them and when their absence is conspicuous. You may be able to provide information that will be helpful to your client. When you learn to distinguish between an orthotic device and a prosthetic device you will be able to explore new ways to increase your client's functioning. As you become aware of client behavior which signals a need for orthotic devices you will be able to solve the problems you identify.

Adaptive Techniques

Pertinent personal tools used in a planned manner become adaptive techniques. An adaptive technique is a method of adjusting to an environment. The degree to which a person practices adaptive techniques is directly related to his physical versatility. The more versatile a person is the less he is required to plan and utilize adaptive techniques. The effective use of such techniques probably gave the "theory of compensation" its widespread acceptance. This theory expressed the belief that if one had a disability that affected performance in one area of competence then the other areas of competence were automatically developed "to compensate." Most counselors do not believe such notions, even those who are aware of the extraordinary use of other sensory pathways as demonstrated by the blind in use of their hearing. They realize that attention to non-visual clues and practice is the reason for their exceptional performance. Adaptive techniques can be performed with a wide variety of skill from early inept efforts to later exceptional performance. Please answer the true-false statements below:

4. The "theory of compensation" refers to industrial accident cases. ____True ____False

5. The more versatile a person is physically the less is his need for adaptive techniques. ____True ____False

6. Exceptional use of normal sensory pathways by disabled persons gave rise to the erroneous theory of compensation. ____True ____False

7. Adaptive techniques are always skillfully performed. ____True ____False

Turn to page 49 to compare your answers.

Adaptive Techniques in the Home

Disabled persons who have been trained in rehabilitation centers have had the opportunity to learn adaptive techniques to be used for self-care. These techniques should be taught to clients by experts in this area. Teaching of self-care in the home requires a knowledge of client's muscle strength, duration of effort and muscular control. For these reasons it should be taught by well informed, paramedical personnel.

Adaptive techniques are usually devised to assist the disabled person to perform some act that he is unable to perform in any other way. They may be devised to remove a hazard that exists while performing such acts. In addition to saving time and energy a good adaptive technique may increase skill, or it may be for cosmetic purposes only. For instance a person who is a hemiplegic gets into the bathtub and out of it in a very precarious and dangerous fashion. The installation of hand rails in proper position and the use of in-tub seats, with training in their use may minimize the danger and increase his speed and efficiency in bathing. Similar hand holds can be provided around the water closet. Placement of towels, soap and supplies within reach of his useful hand and arm are the results of task analysis. Task analysis is a careful and detailed study of what needs to be done, when it needs to be done and who should do it. If the client is determined to be the one who does the task, ways and means are worked out in the environment so that he can perform the needed task with safety and efficiency.

8. Check below valid purposes of adaptive behavior:

____To remove or lessen possible hazards.

____To save time.

____To save energy.

____To improve skill.

____To present a more cosmetic appearance.

____To compensate for a physical loss of ability.

9. Task analysis should precede the development of any adaptive technique. ____True ____False

Turn to page 49 to compare your answers.

Rejection, Over-Compensation or Is There a Reason?

Over-compensation is demonstrated in many forms. Over-achievers are prime examples. It is sometimes shown by a refusal to try aids or to use them. A major goal of most any disabled person is to be independent. When independent, intimate self-care is impossible for the disabled person to achieve he is likely to lose some of this desire for independence. It takes a certain amount of emotional maturity to take advantage of the improvement of function to be gained by using pertinent personal tools and adaptive techniques. If the counselor is aware of some of the reasons for client rejection he may better understand his client.

The device or technique must be "socially acceptable." On the basis of frequency of use, canes and crutches are "more acceptable" to the disabled than walkers. Most walkers are cumbersome-appearing devices and their use connotes extreme disability.

Some disabled persons may reject the use of a needed device because they know the only way to keep their present muscle power and prevent atrophy is to continue to use their muscles. They may also be afraid of other results of disuse such as increased disability and deterioration of essential body systems such as circulation or "waste disposal."

Test your progress by marking items below:

10. A person who rejects help from devices or others when he needs it is always over-compensating. ____True ____False

11. The loss of intimate, personal self-care often sets the limit of what can be done in other areas to create independence. ____True ____False

12. Disuse atrophy may follow the use of mechanical assistive devices. ____True ____False

Turn to page 49 to compare your answers.

Orthotic Devices

Orthotic devices are mechanical assistive devices of a special kind. They are fitted to the body in careful and precise ways. They have three basic functions. They support body weight such as the weight-bearing long leg brace or an arch support. They control joint motion, determine range, direction, and strength. For example, a long leg brace may be constructed for the sole purpose of locking the knee. The short leg brace controls the range of ankle movement preventing drop foot. In controlling joint motion orthotic devices may limit motion such as the stop in a drop foot brace or impede movement where force acts against a spring or a tight joint. They may prevent movement as illustrated by the locked knee joint. By controlling joint motion activity may be restored. In addition, orthotic devices are used to change the shape of body tissues. A corset is a common example of this function. They may bend or twist bond structures such as a shoe insert that holds the foot in a corrected position when weight is applied. They are also used to stretch soft tissues. The brace used to stretch tight heel cords is a common example.

The functions above tell what orthotic devices do. The purposes for using them are varied. The physician prescribes orthotic devices to prevent additional deformities and to improve function. The patient is more directly concerned with increased function, appearance, and reliability. Orthotic devices prescribed with identifiable and accepted goals in mind are more likely to be worn by the patient. Conservation of energy is also a factor in their continued use. Prosthetic devices, in contrast, replace "body parts."

Based on review of the information above, indicate below which statements are true.

13. A corset is an example of an orthotic device to change the shape of soft tissues.
    ____True ____False

14. The three main functions of an orthotic device are:

    (a) to support body weight;
    (b) to control joint movement; and
    (c) to change the shape of body tissues.
    ____True ____False

15. The success of the short leg braces prescribed for some hemiplegic patients is due to its limitation of ankle movement preventing foot drop.
    ____True ____False

16. Canes, crutches, braces, artificial arms and legs, shoe inserts, heel lifts, hand splints and Ace bandages are all examples of orthotic devices.
    ____True ____False

Turn to page 50 to compare your answers.

Signals to Counselor for Possible Need of Clients for Orthotic Devices

The need for all orthotic devices is not apparent but the counselor can develop certain skills in observing needs that are visible and skills in interviewing will reveal other important needs. A client's gait is a good starting point. Observe any limp. A limp is usually the sign of a different length of one leg. It may also be the result of a severe back knee or a bent knee or a dislocated hip, or a tipped pelvis. For each condition some improvement usually can be made. Studies of normal gait patterns reveal that any disturbance in the pattern such as a limp may increase energy used by excessive amounts. A four-inch differential in leg length on a person weighing a hundred pounds is equivalent to the loss of hundreds of foot pounds of effort in a normal day's activity. Observation of joints and position of limbs will also suggest possibilities for effective use of orthotic devices. The counselor must not assume that because his client was treated in a first-class treatment center his potential physical capacity has been achieved.

The upper extremities can also be closely observed. Limitation of joint movement or lack of control of joint movement are clues. Shoulder, elbow, wrist, fingers, and thumb should always be visually checked. Imperfection in function in these areas jas important implications in determining abilities to work.

Effective use of orthotic devices can increase work abilities and conserve needless waste of energy. The successful use of orthotic devices often paves the way for reconstructive surgical procedures. For example, the improvements in hand function provided by an opponens splint can usually be duplicated by transplants. (An opponens splint positions the thumb opposite the forefinger to enable objects to be grasped and picked up.) A wrist stabilized by a splint can be fused. Any improvement in function of the client usually has significant vocational implications. An improvement of only five percent can be the differerence between employability and idleness.

Indicate below which statements are true:

17. An observant counselor can see the need for all orthotic devices.
    ____True ____False
18. The need for some orthotic devices can only be discovered through counseling techniques.
    ____True ____False
19. Because of the interviewing and observation skills the counselor may be the first person to find client's need for orthotic devices.
    ____True ____False
20. If a client has been treated in a first-class rehabilitation center, the counselor can be sure that if anything could be done for the client it would have been done.
    ____True ____False
21. Many times it is possible to use orthotic devices to improve function and to pave the way for client's acceptance of reconstructive surgery.
    ____True ____False

Turn to page 50 and compare your answers.

In the case memo below:

22. Circle three areas of the client's environment which should be checked for the use of adaptive devices.

23. Underline at least three activities that could be improved by training.

A client has been unable to make a satisfactory adjustment to work. He is a paraplegic from a recent spinal cord injury. He sits solidly in his wheelchair which appears to fit him very well. His feet are properly positioned on the footrests. During the hour-long interview he made no attempt to change his position. During the interview he describes his morning preparation for work. He gets up at 6 a.m., transfers from his bed to his only wheelchair and wheels himself to the bathroom. He completes his toilet activities, shaves, bathes and dresses himself in that order. His most difficult activity is getting into and out of the bathtub. Also, he must struggle to put on his trousers and shoes. His shoes are laced and tied with a granny knot. By 8 a.m. he is ready for breakfast. After breakfast he brushes his teeth, puts on his tie and coat.

The counselor observed the client's method of reaching his car. As he backed his wheelchair from the porch to the sidewalk, he leaned forward in the chair to keep from turning over and landed with a resounding bump on the sidewalk, six inches below. He wheeled to the garage door and unlocked it. Returning to the center of the overhead door, where the pull-rope hung, he gave a mightly pull and lifted the overhead door. He entered the car on the side opposite the steering wheel. Then he reached down, folded up the footrests, and lifted the wheelchair into the front of the car. After he closed the car door, he slid beneath the steering wheel. The wheelchair footrests protruded into the driving area. By 9 a.m. he was ready to travel, although he was red in the face and perspiring profusely.

Turn to page 50 to check your answers.

To check your observational skills circle at least three of the nine adaptive techniques to be found in the memo below and underline at least five of the ten orthotic devices or pertinent personal tools:

Mary is a successful worker, an attractive girl who walks by using two Canadian crutches. Her gait is stable. An automobile crash damaged her spinal cord. She is able to walk only because her leg muscles go into spasm. The tight heelcord on her left foot is corrected by a short leg brace. Her hand grasp is weak and she often picks up objects with a hand on each side of the object. The range of motion in her shoulder is limited; she is able to comb her hair using a comb with an extension. She applies her lipstick by lowering her head to reach her hand. Her lipstick fits into a gadget that has two round bands for her fingers. Similar to many persons who must walk with aids which require both hands, she can work only in a sitting position. In order to save time and energy that would be used for loading and unloading her wheelchair into her two-door, hardtop automobile, she has one wheelchair at home and another at work. This forces her to undergo a necessary minimum amount of walking each day.

Her job requires her to answer the telephone and write messages for later transmission. Her telephone is placed on an adjustable arm which she adjusts after she sits down. She answers the telephone by flipping a switch. She is able to write efficiently with her ballpoint pen which has a small receptacle on it for her fingers. She files her messages in spring loaded clips. She opens the clip with the heel of her hand while she inserts the paper she has placed between her first and second fingers. She is quite independent in her daily work and rarely requires help from her co-workers. When she needs help she asks for it in a matter-of-fact way, making it easy for others to assist her.

Turn to page 51 to check your answers.

Answers to

THE USE OF PERTINENT PERSONAL TOOLS,
ADAPTIVE TECHNIQUES, AND ORTHOTIC DEVICES

Answers to Page 41:

1. True

2. True

3. False — The use of some of the special devices might improve function of the non-disabled.

Answers to Page 42:

4. False

5. True

6. True

7. False — Adaptive techniques are learned activities and follow the same development as any learning process.

Answers to Page 43:

8. All items should be checked

9. True — It is the only method that will assure that the answers will pertain to the identified problems. The method asks such questions as "is it necessary for the client to perform this task?", "is the present continuity of tasks a reasonable one?", etc.

Answers to Page 44:

10. False — There may be justifiable reasons for rejection. The counselor should investigate carefully and discuss with his client the reasons for rejecting a device.

11. True — Other persons very often relegate the severly disabled to infant status when they help in intimate tasks. Only the exceptional severely disabled person is able to see his need in proper perspective and refuse to take the "relegated" status.

12. True — This happens when the devise used usurps the only activity that formerly exercised the pertinent muscles. Frequency of use when cut down materially can cause weakness and loss of function.

Answers to Page 45:

13. True

14. True

15. True

16. False — Artificial arms and legs are prostheses, they replace "body parts".

Answers to Page 46:

17. False — All orthotic device needs are not visible.

18. True — Counselor should feel free to discuss client's disability - that is the main reason he is here.

19. True

20. False — A continuing myth - emergency surgery often rules out reconstructive work.

21. True

Answers to Page 47:

	Areas	Devices Probably Needed
22. a.	Bathroom	Shower facilities, handrails, bathtub seat
b.	Porch	Ramp
c.	Garage	Door opener or stronger counterbalance

23. Activities that could be improved by training:
   a. Proper use of wheelchair:
      1) Change position in chair frequently in order to prevent pressure sores
      2) Avoid jumping curbs or steps
      3) Avoid bruising jolts to posterior and wheelchair
   b. Getting into auto:
      1) Approach and enter driver's side
      2) Avoid scraping or abrading posterior
   c. Loading wheelchair:
      Utilize pivot action of rear wheels by first picking up front casters and starting chair into car behind front seat. Hold chair securely with left hand, grasp driving rim of wheelchair with right hand, and use the front tire to help load the chair. This method utilizes much less energy.

Practically every activity of this client can be improved. The time for these necessary activities can be cut in half and proper planning for suitable equipment will conserve much energy.

Answer to Page 48:

Mary is a successful worker, an attractive girl who walks by using two Canadian crutches. Her gait is stable. An automobile crash damaged her spinal cord. She is able to walk only because her leg muscles go into spasm. The tight heelcord on her left foot is corrected by a short leg brace. Her hand grasp is weak and she often picks up objects with a hand on each side of the object. The range of motion in her shoulder is limited; she is able to comb her hair using a comb with an extension. She applies her lipstick by lowering her head to reach her hand. Her lipstick fits into a gadget that has two round bands for her fingers. Similar to many persons who must walk with aids which require both hands, she can work only in a sitting position. In order to save time and energy that would be used for loading and unloading her wheelchair into her two-door, hardtop automobile, she has one wheelchair at home and another at work. This forces her to undergo a necessary minimum amount of walking each day.

Her job requires her to answer the telephone and write messages for later transmission. Her telephone is placed on an adjustable arm which she adjusts after she sits down. She answers the telephone by flipping a switch. She is able to write efficiently with her ballpoint pen which has a small receptacle on it for her fingers. She files her messages in spring loaded clips. She opens the clip with the heel of her hand while she inserts the paper she has placed between her first and second fingers. She is quite independent in her daily work and rarely requires help from her co-workers. When she needs help she asks for it in a matter-of-fact way, making it easy for others to assist her.

WHAT LIES BEHIND THE WORK HISTORY

By: A. G. Garris, Consultant

California Department of Rehabilitation

Robert E. Howard
Director

This is the third in a series of six self-instructional aids published by the Department of Rehabilitation. These training aids are the product of an innovation project supported, in part, by a grant from the Social and Rehabilitation Service, Department of Health, Education, and Welfare, Washington, D.C. 20201.

The purpose of this self-learning device is to accelerate the process of gaining pertinent information early in the rehabilitation process. In addition it presents a simple but effective technique to newer members of the counseling staff. As a counselor's knowledge of varied occupations grows, so grows his effectiveness. Every interview is an opportunity to increase job knowledge. What does the job require physically? What are the mental or psychological requirements?

The discovery and utilization of interests, skills and past experience not only shorten the retraining period but offers insurance that the new activity will be as rewarding as possible.

To start the process of obtaining useful and pertinent information begin with the following brief work history which a typical client might supply:

Case information provided by client:

Work history - last job is listed first Age 35, Male, Married, One child

Duration	Work Classification	Company	Duties	Hourly Rate	Reason for Leaving
5 yrs.	Baker	Barbara Ann	Working Foreman Supv. 15 bakers last six months	$3.10 hr.	Twisting injury to back
10 yrs.	Truck Driver	Cross Country Vans	Long Haul Drove Truck	$5.60 hr.	"To Better Self"

Before considering what questions to ask the client, examine the situation and determine what is likely to occur during this information-gathering interview.

The work history prepared by a client is usually as bare as the one above. It does not indicate the degree of difficulty of the jobs, the physical and mental requirements, or much other information necessary for a vocational diagnosis. The counselor must develop techniques to obtain relevant job information quickly and to institute appropriate case action.

Several difficult conditions may exist at the beginning of the interview. The client may deliberately withhold information related to his reasons for leaving any former job. He may hide the number of jobs he has tried, or be ashamed of a spotty work record. In such conditions, getting the facts requires the counselor's patience and determination. Job titles mean different duties; current and previous use varies in different industries. Only careful questioning will reveal the real tasks and responsibilities of a job. The client's use of euphonious job titles may be a clue to his desire to present his employment history as favorably as possible. The careful counselor will discover that a "maintenance engineer" performed janitorial duties, or that a "pilot" in a dairy "piled it here and there." Cutting through the quagmire of information the client wants to give in order to find the information the counselor really needs often becomes a difficult chore.

Other predisposing conditions may obscure attempts to obtain an accurate picture of the client's work history. If the client mentions a job classification or industry unfamiliar to the counselor, the counselor must decide if he should reveal his ignorance to the person he is supposed to help. The counselor's behavior is guided by ambiguous goals. Fear of losing the client's respect or cooperation may cause him to defer questioning. If the counselor preceives the situation as an opportunity to learn, he will ask for a thorough explanation. Under these circumstances, the client warms to his teacher role and better raport is established. Such a counselor learns about jobs at every opportunity.

Review the job information provided by client on page 52 and note the facts listed in the left-hand column. In the right-hand column write their underlying meaning, or the question they elicit, opposite each fact.

Examples 1 and 2 have been completed. Continue with 3.

FACTS	MEANING OR QUESTIONS RAISED
1. Client has worked mainly in jobs involving direct contact between man and machine, "man-machine job combinations".	Probably likes it or at least tolerates it.
2. Machines and processes set the pace in bakery work. In his truck driving he set his own pace.	This is a radical change. Why did he become a baker?
3. Reason given "To better self" does not "compute" because his wages were reduced.	
4. He gave up a job that permitted a wide range of independent judgement and activity to take a job in which machines and processes were pre-set and determined the activity.	
5. He took a great financial loss in hourly pay, from $5.60 to $3.10.	
6. He changed work environment from outside (uncontrolled) environment to inside (controlled) environment.	

Turn page and compare analysis.

The "answers" below are indications of directions to go in the interview. The same facts may generate many lines of questioning that may be as pertinent as these indicated. By using the information as continuing input, the interview can proceed rapidly to pertinent subjects.

Example 1. Probably likes it or at least tolerates it.

Example 2. This is a radical change. Why did he become a baker?

Example 3. What other things about the job would be "better"? Is the answer given correctly?

Example 4. Why did he make the change? Did his wife complain? Was it easy for him to make the change in jobs? If so, this may indicate that client is adaptable.

Example 5. May not be motivated by money?

Example 6. He was either mismatched as a truck driver or as a baker, or else he is extremely adaptable.

Continue on next page.

Practice does not cause improvement unless the practice utilizes recently acquired knowledge. This exercise provides an opportunity to be creative in the counseling process as you analyze the work history.

Case information provided by client

Age 29 Male Married, three children

Work history - last job is listed first

Duration	Job	Employer	Job Duties	Rate of Pay	Reason for Leaving
2 yrs.	Treatment in Rehabilitation Center				Discharged
5 yrs.	Med. Tech.	Private Lab	Performed reg. Med. Lab procedures	$400/month	Severe polio
2 yrs.	Student	Completed education as Medical Lab Technician			
2 yrs.	Medic	U.S. Army	First Aid Asst. M.D.	$76/month	War ended

In the left-hand column write the pertinent facts; in the right-hand column write their meanings or the questions they evoke:

FACTS	MEANING OR QUESTIONS RAISED
1.	
2.	
3.	
4.	

Turn page and compare analyses.

The facts and meanings or questions shown below indicate only one of several possible analyses of the work history. Alternative approaches indicate a counselor's individual manner for gaining meaningful information. For instance, some counselors will generate a line of questioning on the maintenance of the family and bring out equally valuable information.

FACTS	MEANING OR QUESTIONS RAIDED
1. His work was a service for people.	Client has desire to serve others. He prefers job activity that has some humane qualities.
2. Continued preparation.	Vocationally suited for his work or he would not have continued in this related field after military service.
3. Capable of performing exacting and precise procedures.	Observe client's manipulative abilities and endurance factors, such as manual dexterity, sitting tolerance, etc.
4. Capable of unpleasant and tedious work.	Shows a good degree of mental and emotional maturity?

During the next interview with the medical technician the counselor obtained additional information. Testing, observation, and trial use revealed the following:

1. Client scored "bright normal" in intelligence test.
2. He was unable to stand and his arms were too weak to propel his wheelchair.
3. Tip of finger dexterity was poor but there was sufficient movement in both hands to use a compound microscope when it was placed in the proper position.
4. Because of almost total back fusion he was unable to bend over to look in a microscope in a normal way.
5. His disability was job connected and his income from industrial accident insurance was insufficient to provide for his family.
6. Client appeared highly motivated to prepare for any work he could do, but he preferred to stay in the paramedical field.
7. Sitting tolerance was sufficient for 10-hour day.
8. Visual acuity was unimpaired.

A. Circle the number of the above item which indicates that a special device will be needed. What kind of device will be needed? _____

_____

B. Circle the number of the item which shows the need for a special kind of wheelchair. What kind of chair would you suggest? _____

_____

C. What occupational areas does the above information point to?

_____ _____ _____

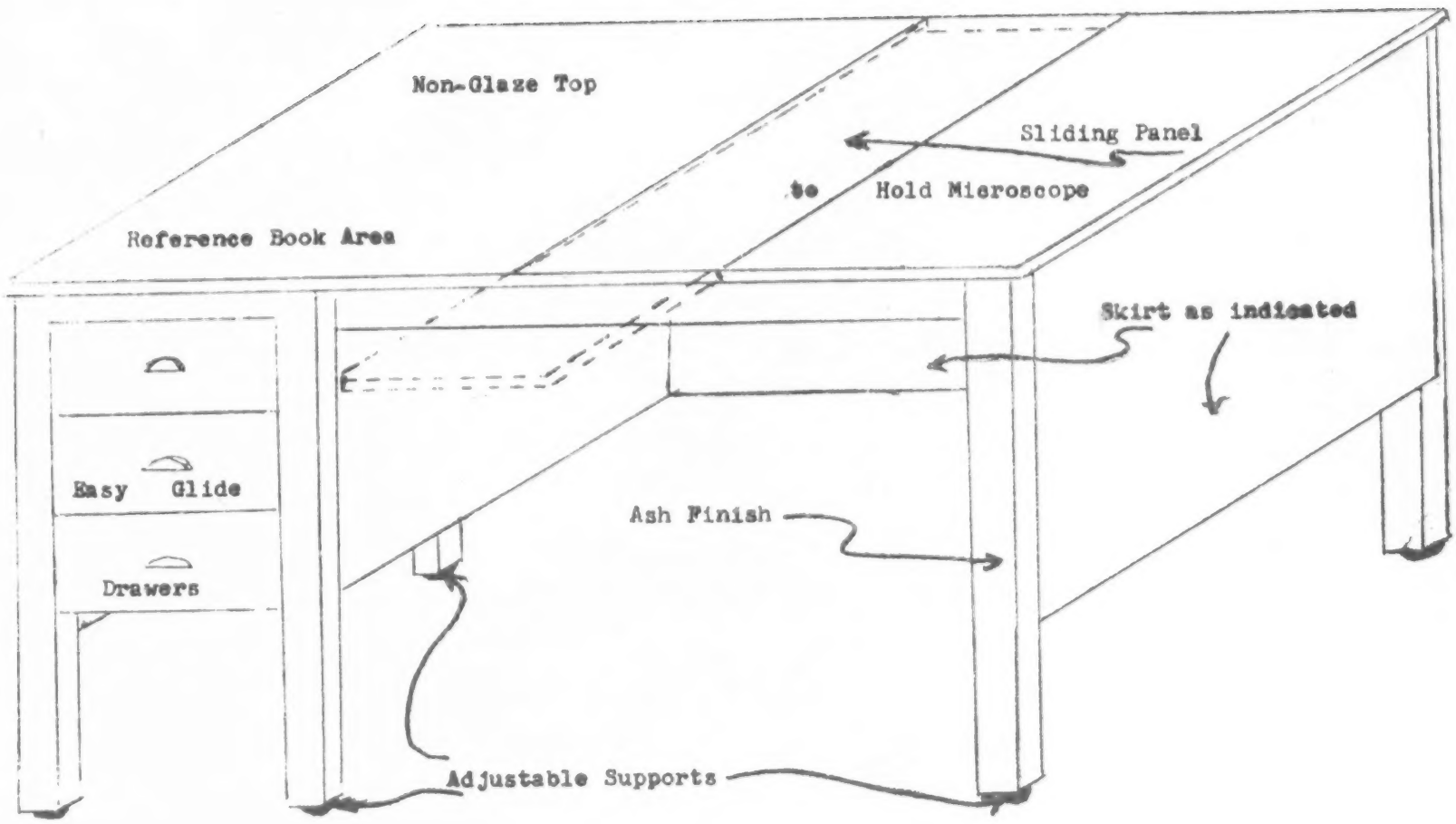
Turn page to compare analyses.

A. Number 4 presents a serious vocational problem. If he could not bend over the microscope it must be brought to him in some way. A special desk with a sliding panel was constructed. See sketch of desk on the next page.

B. An electric, belt-driven wheelchair is indicated for a case as totally involved as this one.

C. A number of special placement situations could have been considered for this client. Short-term training as a cytology technician was provided. Other sedentary occupations which permit limited finger dexterity could have succeeded equally well.

SPECIAL DESK WITH ADJUSTABLE WORK SURFACE



Scale 1" to 1'-0"

GUIDE FOR INTERVIEWING

PERSONS WITH SPINAL CORD INJURIES

By: A. G. Garris, Consultant

California Department of Rehabilitation

Robert E. Howard
Director

This is the fourth in a series of six self-instructional aids published by the Department of Rehabilitation. These training aids are the product of an innovation project supported, in part, by a grant from the Social and Rehabilitation Service, Department of Health, Education, and Welfare, Washington, D.C. 20201

A GUIDE FOR INTERVIEWING PERSONS WITH SPINAL CORD INJURIES

This information about persons with spinal cord injuries will identify their problem areas and promote more comprehensive medical and rehabilitation services for them. A survey of successfully rehabilitated cases indicated that consideration of these factors was influential in their success. The list is not exhaustive but will serve as a guide for obtaining pertinent information to be incorporated into the rehabilitation plan.

I. Information relative to spinal cord injuries

A. Was any surgery performed? Was a laminectomy performed in order to determine whether the spinal cord was actually severed or if it was only injured? Determine if any improvement has been made since the injury occurred.

B. At what level of the spinal cord did the injury occur? This will help determine the extent to which self-care and other activities will be possible.

C. Does the applicant have any paralysis of his arm? What movements are possible in elbow, wrist, and fingers? Is the sense of touch undisturbed? Is there any sensitivity to heat?

D. Is the applicant able to transfer in and out of a wheelchair alone, or must he be lifted in and out? Are any special devices used? How old are such devices? Did he receive any training in transfer activities? Would he benefit from training in transfer activities?

E. Can he walk or stand in any manner - with braces, crutches, canes, etc.? Determine extent of such ability and any assistance needed.

F. Can he get on and off a regular public toilet? If not, what kind of devices does he need?

G. If his arms are weak try to determine his "pushing down" strength.

II. Information relative to urinary and bowel problems

A. Does applicant have an indwelling catheter? If so, he probably has a low degree of chronic infection. Inquire what medication he is taking to control the infection. Were there any hospitalizations for acute infection?

B. If he wears a urinal, can he empty it himself? Is there continuous drainage or stop and go?

C. Does applicant have regular urinary supervision with urinalysis, etc.? By whom? How often?

D. Are there any other urinary tract difficulties, such as hemorrhage, pain attacks, difficulties in starting or stopping?

E. Any bowel problems? How controlled?

III. History of Decubiti

A. Has applicant ever had a "bed sore?" Determine size, location and how it was healed. Number of recurrences?

B. How does applicant avoid pressure sores? (Note if he changes positions frequently.)

C. What kind of cushion does he use? Note condition and whether any odor is present.

IV. Information on Wheelchair

A. Note fit and condition of wheelchair. Does it appear in good repair and is it clean? Who prescribed it? Does applicant have any complaints about it?

B. Dirty wheelchair wheelbearings increase friction and require excess energy to propel. Wobble in the wheels indicates wear - pull chair forward to get idea of effort it takes to move it. A three-four-pound pull should move the chair while it is supporting the applicant.

V. Information relative to pain and sensation

A. Is any pain present constantly or only after periods of extended sitting?

B. Is any sensation present in the lower extremities? Define the extent of nonfeeling areas. If surface feeling is lost, heat sense and pressure sense probably are lost or severely deficient.

C. Does applicant take any medication for pain? What kind and how often?

VI. Information relevant to home conditions

A. Does applicant live alone? If not, with whom?

B. Does applicant need assistance with his self-care?

C. How is his cooking and housework performed?

D. Does he have any unsolved physical problems in the home - such as narrow doors, ramps, need for special handrails or hydraulic lifts?

(Making home care as efficient as possible may not at first seem a vocational problem; however, it has been the experience of former specialists that this has a very direct bearing on performance of the client in training and on the job.)

VII. Information relative to transportation

A. Does applicant drive a car? What year and model?

B. How is the car equipped?

C. How old are any special driving devices?

D. Does applicant have valid driving license?

E. Does applicant have car insurance?

F. If he does not drive, does he want to learn?

G. Try to determine his strength of grip and extent of possible arm movement.

H. Can he get in and out of a car by himself?

I. Can he get his wheelchair in and out of the car? If not, what is the main problem?

DISUSE, THE UNDEREVALUATED FACTOR IN DISABILITY

By: A. G. Garris, Consultant

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DISUSE, THE UNDEREVALUATED FACTOR IN DISABILITY

The rehabilitation counselor, seeing a physically disabled client for the first time, should ask himself, "can this client's function be improved?" Disuse is often a factor in disability which is commonly overlooked.

The patient who has suffered a coronary thrombosis will have remained quietly in bed or chair for a long time and will have lost normal muscle tone. When beginning any exercise he will become short of breath and have a sense of fatigue. He may believe these signs are due to "poor circulation" or "bad heart" when actually they are present because he has not been using his heart and muscles normally. The medical profession took a long time to learn the advantages of early ambulation.

Evaluating these factors is the major purpose of the heart evaluation team. Its refined, differential study of work tolerance should be of greater use in the rehabilitation process. If a team is not available, the medical consultant can recommend a cardiologist to set up and supervise a program of increasing activity. This activity program may produce the physical capacity which may permit a broader vocational rehabilitation program than previously expected of the patient.

Disuse receives less attention among orthopedic disabilities. Periods of inactivity or reduced activity can result in additional muscle deterioration and atrophy. For this reason, each patient should continue to perform at the peak of his abilities. To do less, risks additional deformities and increased disabilities.

The arthritic who limits his joint movements because of pain, eventually will not be able to move such joints at all. Sometimes joint mobility can be restored by surgery. However, to keep hands and other joints functioning requires careful timing and planning.

Disuse among hearing disabilities seems to reduce powers of sound discrimination. The ability to tune-out or to tune-in particular sounds is lost when non-hearing continues too long. With hearing restored this ability does not seem to return. Perhaps a similar loss of speaking ability occurs for this reason among persons with progressive hearing losses.

Disuse factors among psychiatric disabilities are a recent discovery. The "mentally restored" often are easily identified within a social group because they have not used their social talents during their period of withdrawal and treatment. The excellent results of group counseling are attributed partly to the opportunity to renew talking and listening abilities and to relearn responsiveness to the needs of others. Learning to live again, emerging from a life of severe isolation which lacked adequate stimuli, is often a frightening experience. Disuse appears in its most grotesque and desolate forms. Its stagnating effects limit physical activity and interfere with the thinking and feeling processes. Fortunately, a restorative program can teach appropriate ways of attending and reacting to the "main stream" activities.

The effects of disuse are apparent among amputees. Often there are contractures from sitting or failure to maintain a range of motion. The early fitting of prosthetic limbs attempts to overcome these problems. Demineralization and osteoporosis are frequently the result of disuse. Sensory losses interfere with standing balance. Some of the proprioceptive losses are very real, yet, immediate use of prosthetic device fitting seems to nullify their potential limitations.

The stroke victim illustrates disuse factor. Formerly the typical stroke survivor held the paralyzed arm folded in front of his body. The arm supported a dropped wrist and the fingers were drawn into the palm of his hand. The limping gait consisted of a short halting step on the disabled side and a normal length step on the unaffected side. Now, early treatment prevents such contractures and prompt re-education has enabled more stroke victims to relearn to perform activities in a near-normal fashion. The difficulty in forming words, results in their lack of speech. A mechanized teaching aid is now being tested, it will assist them to relearn such self-expression.

In some atrophies one set of muscles is damaged and the opposing set of muscles suffers from disuse. Proper support and functional bracing can limit further atrophy and maintain continuing function of the undamaged muscle. The dystrophies suffer particularly from disuse. Reconstructive surgery is often deferred (to infinity) because forced inactivity often results in permanent loss of function. In the medical management of the dystrophy case, any change in functioning restrictions should be promptly and carefully evaluated. The restricted shoulder-arm movement syndrome is often caused by pain when the arm is moved. Restricted use of shoulder range of motion can also cause it. It may result from other causes such as cardiac problems or trauma. Surprisingly such disuse often occurs when the patient is under some medical supervision.

Use of residual strength fluctuates in the physically "normal" person. When disuse is recognized, increased activity easily restores any loss. In the partially paralyzed limb where muscles are being used to their maximum strength, disuse may cause smaller loss in residual strength but it cannot be restored as easily. For example, a change in driving activity, from surface streets to freeways, may result in the disuse and subsequent loss of strength in lower extremities becoming critical before the disabled person realizes his weakening condition.

In nerve-damage and burn cases, some disuse loss cannot be prevented, but physical and other appropriate therapy is often deferred too long and the loss becomes permanent.

This listing of disuse factors is incomplete; the wise doctor and counselor will evaluate the effect of such factors in estimating the potential abilities of his client. To do less would shortchange the client.

ADAPTIVE TECHNIQUES AND ASSISTIVE DEVICES USEFUL IN REHABILITATION

By: A. G. Garris, Consultant

California Department of Rehabilitation

Robert E. Howard
Director

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ADAPTIVE TECHNIQUES AND ASSISTIVE DEVICES USEFUL IN REHABILITATION

An adaptive technique is a method of adjusting to an environment. It creates a better person-environmental fit by modification and connotes pliability or readiness. It is another way to accomplish a purpose. It is primarily concerned with physical limitations, but attitudinal acceptance and willingness to change are imperative ingredients of adaptive techniques.

The successful use of adaptive techniques and pertinent personal tools often make self-care possible. Their use in the vocational area increases productivity and may provide a way to perform job tasks formerly considered to be impossible.

A technique, to be maximally useful, must be socially acceptable. It cannot differ too radically from the way that normal persons perform a task. For instance, a person with a double amputation may crawl to the bathroom in the night not wanting to go through the difficulties of installing his prosthesis, yet this adaptive technique will be restricted to privacy or some emergency situation such as a fire in the home.

Adaptive techniques are devised to meet identified needs. These needs may involve the conservation of energy. The devised techniques often are performed in habitual patterns. For instance, a person using a cane may use it to turn on lights, to pick up clothing, or to reach overhead to knock some item from a shelf. These activities may be physically possible for him to accomplish but he can use his cane to save the energy required to walk, bend over or climb.

Mechanical assistive devices are any tools that may be used while performing adaptive techniques. As the degree of disability increases, the complexity of the devices also increases. If a disabled person has stiff hips and cannot bend over, reaching devices of several types may be necessary.

The availability of ingenuity and creativeness differs from person to person. Some of the disabled have to formally learn the use of assistive devices and adaptive techniques. The use of pertinent personal tools is often learned within a rehabilitation center where the patient is fitted with braces, splints, or specially designed and constructed devices. He may also learn basic adaptive techniques that pertain to self-care. This training often becomes the framework for devising special techniques to enable him to function better in areas other than self-care. One of the great values of rehabilitation center training is the opportunity of learning from other patients and observing how they do things. If a person has not been exposed to such training, it is doubtful that he is using all the adaptive tools and techniques that would enable him to function better.

Observing and asking the right questions will reveal problem areas. Existing devices and aids may solve the problem if properly selected and fitted. Mistakes in this area are easily spotted. For example, a cane or crutch or walker may be too long or too short. The cane user's arm should have a bend of 15 to 20 degrees. This is important as a shock absorber and permits quick adaptation to irregular terrain. Walkers should be fitted with the same degree of bend as the elbow. Crutches should not support the weight of the person at the top of the crutch. The purpose of the crutch extending into the armpit is to establish another point of control. To support weight there often causes "crutch paralysis." The bottom of these aids should be carefully examined. Ball-shaped rubber tips should be replaced with suction type flat end tips of soft rubber that tend to adjust to the ground.

The range of products commercially available is quite wide and varied. Information sources for locating such products and fitting them to the patient-client are fairly well developed. Exceptions are prototypes that have only recently been built.

For devices not yet made, or even thought of, the task is more difficult. These devices for the disabled arise as the recognition of a problem. Peter Drucker writes in Landmarks of Tomorrow, "a problem begins to be solved the moment it can be defined, the moment the right questions are asked, the moment the specifications are known which the answer must satisfy. For then we know what we are looking for, what fits, and what is relevant."

The first step then is to define the problem. An actual problem such as the one proposed of a stenographer who has an amputated (above the elbow) right extremity. Assembly of carbon paper and stationery is difficult if not impossible using only one hand. By use of a device with a combined paper storage and stacking area plus an electric typewriter (motor-operated roller) the problem was solved. This innovation has been rendered obsolete by another innovation - economical copy machines. Another innovation necessary for this client who worked from a wheelchair was the availability of area for collation of reports, etc. Having the use of her left hand-arm only the left portion of a regular desk would be accessible. A half circular desk was designed with a movable platform for her wheelchair. This solution made all the desk area available to her reach. An alternate idea was to design the desk top to revolve, but this idea was discarded as an innovation too "far out" for client acceptance. In fact, the semi-circular desk was also rejected by the client for the same reason. The client's need to appear as "normal" became the deciding factor, even though function would have been increased and much daily energy saved. Mechanical devices achieve man-machine efficiency only if the readiness or pliability exists in the user.

As the complexity of the learning pattern for control of devices increases the chances for its continued use declines. One of the most expensive assistive devices ever constructed was the Sabre Arm designed and built by engineers of North American Aviation Corporation. It was a device to move a completely flail arm. All controls were by means of foot movements. In order to make purposeful movements of the arm, it was necessary to make precise movements of the foot. The learning pattern was very difficult to master and required close concentration by the user. The most successful manipulative devices that have

been developed duplicate motions of the user. These are used in radiation laboratories and in underwater repairs. Closed circuit television may also be used concurrently. Myoelectric control development is an attempt to pick up normal nerve impulses to direct specific movements of the extremity. If successful, this approach will enable patients to "think" the action in a normal fashion without other imposed artificial mental or physical activities. This will increase efficiency and eliminate training of a long-term nature that some devices now require. The "golden arm" produced at Rancho Los Amigos through a VRA grant is estimated to require training equivalent to learning the touch system on a typewriter.

The newly disabled may have difficulty in utilizing adaptive techniques as their use may require a change in life-long habits. One common adaptive technique is to get to appointments early, particularly if the disability slows down ambulation or restricts the walking distance. At times it is necessary to obtain prior information on facilities, such as parking lots and architectural barriers. For a person who characteristically appears at the last minute, such radical changes in habit are not accomplished without a certain amount of trauma.

Planning ahead is an adaptive technique that will prevent situations from becoming problems. It is probably the most important of the adaptive techniques.

Consideration of the probabilities is a rightful part of planning. Unfortunately, one cannot always rely on intuitive estimation of probabilities. It can be safely assumed that if weakness and incoordination of the lower extremities is present there will be falls. The accepted adaptive technique is to learn how to fall and also learn how to get up again. This technique when properly learned enables a person to avoid entanglement and to "cooperate with the inevitable." Rolling with the fall prevents many serious injuries.

Employer acceptance can often be gained with the use of proper devices and adaptive techniques. Instability of gait has caused many disabled persons to be rejected for jobs they could have well performed. Many disabled persons who disdain the use of devices and who stumble around would be much more employable even in a wheelchair. This would remove an employer's fear of falling accidents.

If due consideration has been given to the areas of adaptive techniques and assistive devices the person renovated for the job may say, "I am not disabled, I just appear that way."

APPENDIX B

Typical District Introductory Program

Time	
30 min.	Synovectomy Film (Arthritis) by Dr. Marmer, U.C.L.A.
15 min.	Question and Answers on Film by Dr. Bushnell, Associate State Medical Consultant
90 min.	Homer Pheasant, M.D., Orthopedist in Charge of V.R.A. Back Project, "New Ideas from the Back Project"
45 min.	Introduction of Project Services and How to Use Them by Project Director
20-45 min.	John Bushnell, M.D., "How to Use Medical Consultation" or "New Happenings in Medicine"
60 min.	"How Do You Really Feel About the Severely Disabled?" by James Holt, Ph.D., Psychologist, Back Project
60 min.	Discussion

The program spot by Dr. Pheasant is filled by Dr. Gucker in districts where back problems are not paramount. Dr. Gucker explains the nature of orthopedic problems and emphasizes "repair" and how to lessen the disability. The duration of any program is determined by the District Administrator.